

December 2002

**Chetco River and Boat Basin
Sediment Quality Evaluation
August 20, 2002**

(Re-Sample of the Area Associated With Samples CHET-P-01 & CHET-P-02 of the August 2001 Sampling Event)

ABSTRACT

This evaluation was conducted following procedures set forth in the Inland Testing Manual² and the Ocean Disposal Testing Manual (Green Book)⁷, developed jointly by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency to assess dredged material. Guidelines used are those developed to implement the Clean Water Act³ and the Marine Protection, Research and Sanctuary Act⁴. These guidelines and associated screening levels are those adopted for use in the Dredge Material Evaluation Framework (DMEF) for the Lower Columbia River Management Area, November 1998¹.

The August 20, 2002 sampling event at the Chetco Federal Navigational Project was a follow-up to questions regarding detected levels of nickel (Ni) and 3- & 4-Methylphenol above Dredge Material Evaluation Framework (DMEF) screening levels (SLs) reported in data from the August 21, 2001 sampling event⁶, in samples 01 & 02. These levels were suspected to be the result of laboratory error, as the compounds did not turn up at the same levels in all sequential runs. As it could not conclusively be determined that the results accurately characterized the sediment, re-sampling and analysis were deemed necessary to establish a weight of evidence, of analytical data, to best reflect levels of contaminants of concern in the potential dredging prism.

On August 20, 2002 five (5) surface grab sediment samples were collected from the Chetco Federal Project in the area referenced above as needing characterization due to unresolved analytical issues. All samples were submitted for physical analyses including total volatile solids, total organic carbon (TOC) and for analyses of the chemicals in question, nickel (Ni) and 3 & 4 methylphenol.

Mean grain size for all the samples is 0.09 mm, with 0.00% gravel, 63.98% sand, 36.02% fines, and with 4.94% volatile solids.

None of the contaminants tested were found to be at or above the DMEF screening level (SL) upon re-sampling. Some low levels of phenols was detected, but not at levels of concern. Nickel (Ni) was also detected, but at levels sufficiently below the SL to determined all sediment suitable for unconfined, in-water placement without further characterization.

INTRODUCTION

This report characterizes the sediment to be dredged at Chetco River Federal channel and boat basin entrance channel for the purposes of dredging and disposal. Sampling and analysis objectives are stated in the Sampling and Analysis Plan (SAP August 2002), and are also listed below. This report will outline the procedures used to accomplish these objectives.

Sampling and Analysis Objectives

- Characterize sediments in accordance with the regional dredge material-testing manual, the Dredge Material Evaluation Framework for the Lower Columbia River Management Area (DMEF; to be expanded to include all of Oregon).
- Collect, handle, and analyze representative sediment of the proposed dredging prism for all fine-grained material in the boat basin and specifically sediment associated with samples CHET-P-01 & CHET-P-02, in accordance with protocols and Quality Assurance/Quality Control (QA/QC) requirements².
- Characterize sediments to be dredged for evaluation of suitable disposal methods.
- Conduct physical and chemical characterization only for this sediment evaluation, unless DMEF screening levels are exceeded and further characterization (Tier III Biological Assays) is needed to determine disposal method.

PREVIOUS STUDIES

The U.S. Army Corps of Engineers (Corps), Portland District, routinely evaluates sediment from its projects on a 5-year rotation. Physical and chemical evaluation sampling was performed at Chetco River starting in 1982, 1991, and 1996⁵. The results of these studies revealed the sediment, in the Federal entrance channel, to be predominately sand (>80%) with volatile solids (<5%, with some exceptions), with the sediment from the turning basin generally containing 20% to 50% fine-grained material. Sediments from previous studies were determined to be suitable for in-water disposal.

Results from the August 21, 2001 sampling event at the Chetco River Federal channel and boat basin entrance channel showed the level for nickel in sample CHET-P-01 and for silver in all three samples was initially at or above the SL. These results were suspected to be the outcome of lab error. The lab reanalyzed the samples for nickel and silver in duplicate to verify the results. The results for silver showed good correlation with levels well below the SL, and therefore did not verify the earlier “hit”. The reanalysis of nickel was at the SL and not substantially lower than the original analysis, necessitating further characterization by re-sampling and analysis to verify its presence in the dredging prism.

Additionally, the lab had concerns that the original analysis for semi-volatile method 8270 was suspect and reanalyzed the samples three (3) times. During the third analysis,

samples CHET-P-01 and CHET-P-02 each had a value of 2100 ug/kg for 3- & 4-Methylphenol, greatly exceeding the SL (670 ug/kg). The values reported for these samples during laboratory analysis #1 and #2 were below the SL, but due to the uncertainty associated with the varied results, it was recommended by the Corps sediment quality experts and other members of the Regional Management Team (RMT), that the sediment associated with CHET-P-01 and CHET-P-02 be re-sampled and re-analyzed for phenols and nickel (Ni), to establish a weight of evidence, that levels were considered suitable for in-water disposal.

All sediment, represented by samples CHET-P-03 through CHET –P-06 samples of the August 21, 2001 sampling event, was determined suitable for in-water placement without further characterization.

CURRENT SAMPLING EVENT/DISCUSSION

On August 20, 2002 five (5) surface grab sediment samples were collected from the Chetco Federal Project (see Figure 1 and Table 1). The samples were collected using a Ponar sampling device. All samples were submitted for physical analyses including total volatile solids, total organic carbon (TOC) and for analyses of the chemicals in question, nickel (Ni) and 3 & 4 methylphenol. The current sampling event is a re-sample of CHET-P-01 & CHET-P-02 of the August 20, 2001 event (See Previous Studies Section & Figure 2).

Table 1. Sample Location Coordinates

CHET-P-01	42° 02.808' N 124° 16.033' W	CHET-P-04	42° 02.907' N 124° 16.105' W
CHET-P-02	42° 02.856' N 124° 16.070' W	CHET-P-05	42° 02.952' N 124° 16.127' W
CHET-P-03	42° 02.863' N 124° 15.095' W		

ANALYTICAL RESULTS

Physical and Volatile Solids (ASTM methods): All five (5) samples were submitted for physical and TVS analyses and the data are presented in Table 2. Four (4) of these samples were classified as “silty sand” and were black in color; the other sample was classified as “sandy lean clay.” Mean grain size for all the samples is 0.0851 mm, with 0.00% gravel, 63.98% sand and 36.02% fines. Volatile solids for all the samples ranged from 3.76% to 6.60%.

Nickel (EPA method 6020/7471), Total Organic Carbon (EPA method 9060): Five (5) samples were submitted for testing and the data are presented in Table 3. All samples showed levels of Nickel below the SL by an average of 28%. TOC ranged from 12,400 to 23,400 mg/kg.

Phenols (EPA method 8270): All five (5) samples were tested for Phenols and the data are presented in Table 4. All samples showed levels below the SL for Phenol by an average of 96.74%. The samples showed levels below the Method Detection Limit (MDL) of the four (4) additional Phenol analytes tested.

CONCLUSION

On August 20, 2002 five (5) surface grab sediment samples were collected from the Chetco Federal Project in the area referenced above as needing characterization due to unresolved analytical issues. All samples were submitted for physical analyses including total volatile solids, total organic carbon (TOC) and for analyses of the chemicals in question, nickel (Ni) and 3 & 4 methylphenol.

None of the contaminants tested were found to be at or above the DMEF screening level (SL) upon re-sampling. Some low levels of phenols was detected, but not at levels of concern. Nickel (Ni) was also detected, but at levels sufficiently below the SL to determine all sediment suitable for unconfined, in-water placement without further characterization.

Previous study results are consistent with levels of nickel and 3 & 4 methylphenol that were detected in this study. It is considered that the weight of evidence provided determines all sediment represented by the August 2001 & 2002 sampling events is considered suitable for open, in-water placement without further characterization.

REFERENCES

1. U.S. Army Corps of Engineers, Portland District and Seattle District; U.S. Environmental Protection Agency, Region 10; Oregon Department of Environmental Quality; Washington State Department of Natural Resources and Department of Ecology. 1998 Final. Dredge Material Evaluation Framework for the Lower Columbia River Management Area.
2. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. February 1998. Evaluation of Dredged Material Proposed for Discharge in Inland and Near Coastal Waters - Testing Manual (referred to as the "Inland Testing Manual").
3. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency. February 1991. Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual (referred to as the "Green Book").
4. Clean Water Act, 40 CFR 230 (b)(1), as revised 1977.
5. Marine Protection, Research and Sanctuaries Act of 1972.
6. U.S. Army Corps of Engineers. 2001. Chetco River and Boat Basin, Sediment, Quality Evaluation. Portland District.
7. U.S. Army Corps of Engineers. 1996. Characteristics of Sediment at Chetco Boat Basin and Entrance on the Chetco River, 1996. Portland District.
8. U.S. Army Corps of Engineers, EPA Region. 1991. Characteristics of Sediments from The Chetco River Mouth and Small Boat Basin. Portland District & Region 10 EPA.
9. U.S. Army Corps of Engineers. 1982. Sediment Physical Characteristics at Chetco River Federal Navigation Project. , April 1982. Portland District.

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Sampled August 20, 2002

Table 2 Physical Analysis & Volatile Solids

Sample ID	Grain Size (mm)		Percent			
	Median	Mean	Gravel	Sand	Clay/Silt	Volatile Solids
CHET02-P-01	0.09	0.0857	0.00	69.71	30.29	3.76
CHET02-P-02	0.07	0.0655	0.00	53.55	46.45	6.42
CHET02-P-03	0.13	0.1139	0.00	81.58	18.42	3.97
CHET02-P-04	0.12	0.1142	0.00	78.72	21.28	3.97
CHET02-P-05	0.05	0.0461	0.00	36.33	63.67	6.60
Mean	0.092	0.0851	0.00	63.98	36.02	4.94

Table 3 Nickel and Total Organic Carbon (TOC)

Sample ID	Ni	TOC
	mg/kg (ppm)	
CHET02-P-01	93.9 B2	12,400
CHET02-P-02	106 B2	23,400
CHET02-P-03	92.9 B2	12,800
CHET02-P-04	113 B2	21,500
CHET02-P-05	107 B2	17,100
Screen Level:	140	

Table 4 Phenols

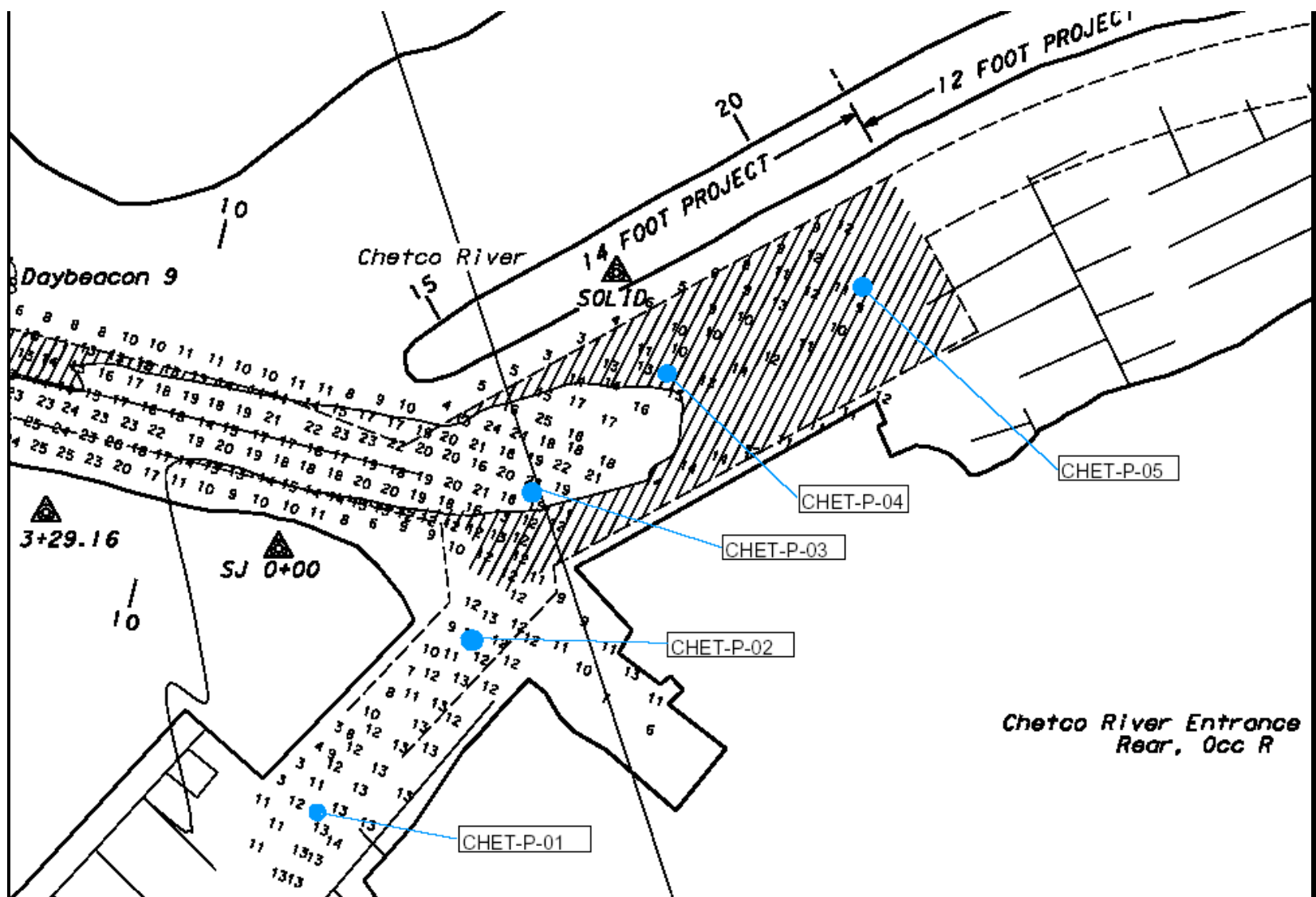
Sample ID	Phenols				
	ug/kg (ppb)				
	Phenol	2-Methyl-phenol	3-&4 Methyl-phenol	2,4-Dimethyl-phenol	Pentachloro-phenol
CHET02-P-01	11.6 J	<2.33	<2.88	<2.14	<4.08
CHET02-P-02	17.2 J	<2.56	<3.16	<2.35	<4.48
CHET02-P-03	12.8 J	<2.21	<2.72	<2.02	<3.86
CHET02-P-04	19.2 J	<3.35	<4.13	<3.07	<5.86
CHET02-P-05	7.62 J	<2.32	<2.86	<2.13	<4.06
Screen level:	420	63	670	29	400

(<) = Non-detect (ND) at the value listed (Method Detection Limit).

J = Estimated value (reported values are above the MDL, but below the PQL).

B2=This analyte was detected in the method blank, sample concentration was >10 times blank concentration.

Sediment Sampling Sites



Sediment Sampling Sites

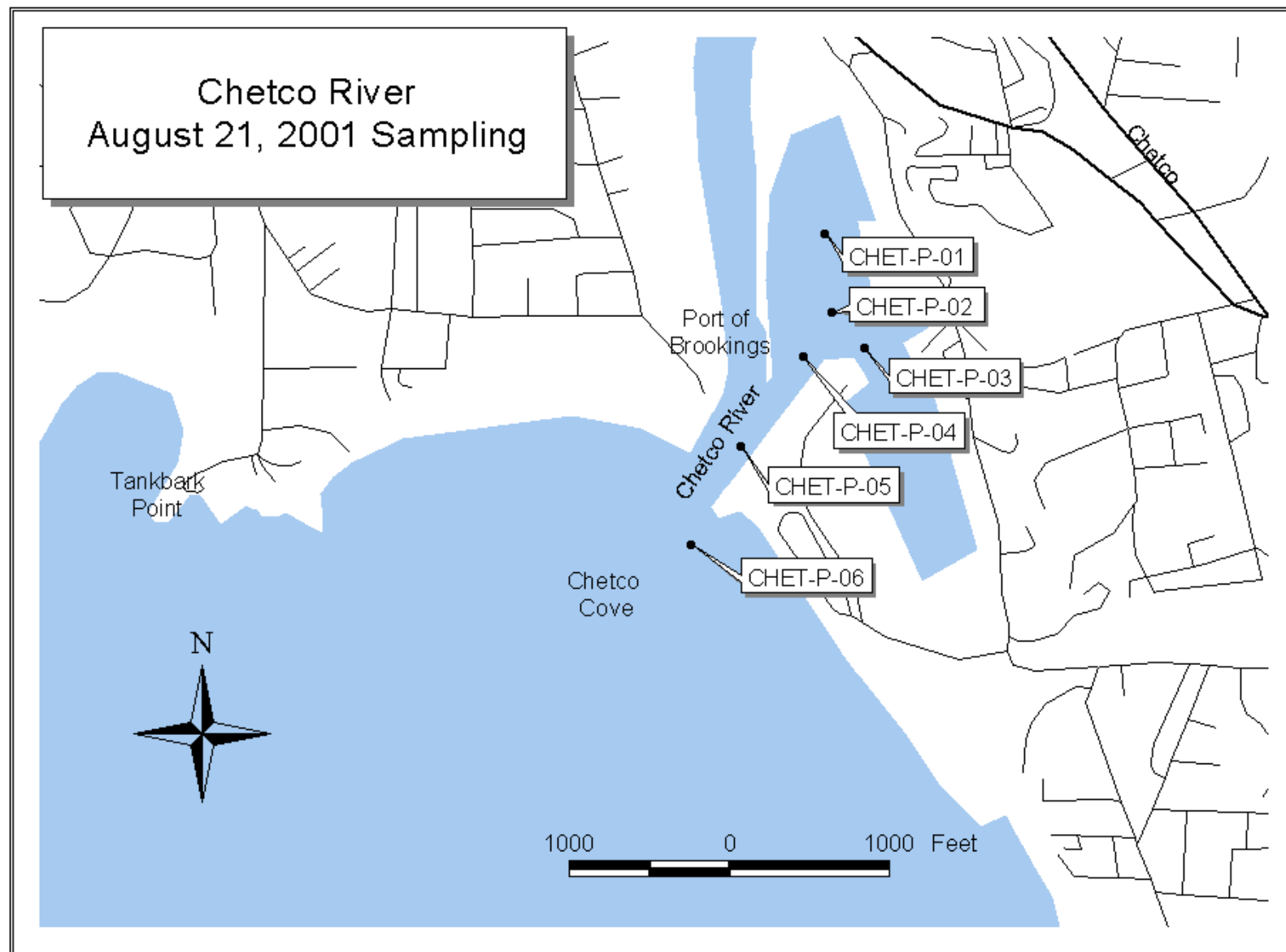


Figure 3,

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